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PATENT SPECIFICATION

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(19)

(54) CHANGE SPEED GEARS FOR PEDALLY PROPELLED VEHICLES

(71) We, RALEIGH INDUSTRIES LIMITED, a British Company of 177 Lenton Boulevard, Nottingham NG7 2DD, do hereby declare the invention, for which we pray that a patent may be granted to us, and the method by which it is to be performed, to be particularly described in and by the following statement:—

This invention concerns gearing arrangements for pedally propelled vehicles such as bicycles, more particularly, Derailleur-type gearing arrangements for such vehicles.

The provision of Derailleur-type gears on, say, a bicycle involves the provision of a number of sprockets, each having a different number of teeth, on the driven rear wheel and adapted to be selectively engaged by the driving chain according to the gearing required. Usually the sprocket assembly is associated with the wheel hub through a free-wheeling mechanism. The assembly consisting of sprockets, free-wheeling mechanism and means for securing to the wheel is commonly referred to as a Derailleur block, and will be so referred to in this specification and the claiming clauses thereof.

The object of the present invention is to provide an improved Derailleur block.

According to the present invention a Derailleur block for a cycle or like wheel comprises sleeve-like means adapted to be rigidly secured to the hub of said wheel, outwardly-facing inboard and outboard peripheral formations on said sleeve-like means each defining one part of a ball race, a sprocket carrier, an internal inwardly-facing formation on said carrier complementary to said outboard peripheral formation on said sleeve-like means to complete a ball race, a free-wheeling mechanism between said sleeve-like means and said sprocket carrier, a cone, in screw-threaded adjustable engagement with the interior of said sprocket carrier at the inboard end ther of, a formation on said cone complementary to the said inboard peripheral formation of said sleeve-like means to complete another ball race, balls in said ball races, a lock nut in adjustable screw-threaded engagement with the exterior of said cone and forming an abutment at one end of said carrier, a first sprocket mounted on said carrier in engagement with said abutment a plurality of intermediate sprockets mounted on said carrier and axially spaced from said first sprocket, and a final sprocket member in screw-threaded engagement with the periphery of said carrier and serving to secure the other sprockets in axial position.

Preferably said sprocket carrier has a larger diameter portion at its inboard end, said larger diameter portion being splined, and a smaller diameter portion at its outboard end, said smaller diameter portion being externally screw threaded, at least some of said sprockets being internally grooved for engagement with said splined larger diameter portion, and said final sprocket member being internally screw-threaded for engagement with said externally screw-threaded smaller diameter portion.

The word "cone" is a term of art used to described an adjusting member for bicycle and like bearings, although not necessarily having a conically shaped portion.

The invention will now be described further, by way of example only, with reference to the accompanying drawings illustrating one embodiment thereof and in which:—

FIG. 1 is an elevation in section through a Derailleur block constructed in accordance with the invention, and

FIG. 2 is a similar view of an alternative component suitable for use in the block of Fig. 1.

Referring now to the drawings a Derailleur block comprises a sleeve 11 screw-threadedly secured to a bicycle wheel hub 12, a sprocket carrier 13 rotatably supported on the sleeve 11, a free-wheel

mechanism 14 interposed between the sle ve 11 and carrier 13, and a plurality of sprockets having diff rent numb rs of teeth mounted on the sprocket carrier 13.

The outer p ripheral surface of the sleeve 11 is of stepped configuration, a larger diameter central portion 11*a* being provided with pockets to receive pawls forming part of the free-wheel mechanism 14.

At either side of the central portion 11*a* the peripheral surface of the sleeve is shaped to define the inner parts of the races of two ball-bearing arrangements 16, 19 the outer part of the race of the outboard ball-bearing arrangement 19 being constituted by a surface 13*a* on the sprocket carrier 13 and the outer part of the race of the inboard arrangement 16 being defined by a cone 17 screw-threadedly engaged with the end of the carrier 13 having a suitably shaped bearing surface 17*a*.

At its inner peripheral surface, the sprocket carrier 13, in addition to presenting the bearing surface 13*a*, presents ratchet teeth 14*a* in radial register with the pawls and for engagement thereby.

The outer peripheral surface of the carrier 13 is stepped, an inboard larger diameter portion 13*b* having three splines 13*c* angularly spaced thereabout for a purpose herafter to be described and an outboard, smaller diameter portion 13*d* being externally screw-threaded. A shoulder 13*e* is provided between the inboard nd outboard portions.

The sprockets 15 are supported on the sprocket carrier 13, three such sprockets 15*a*, with spacers 15*a*' therebetween, being arranged in axially spaced relationship on the larger diameter portion 13*b* of the carrier 13, and the carrier 13, and the remaining two sprockets 15*b*, whether as two individual sprockets as shown in Fig. 1 of the drawing or as parts of a single component (Fig. 2) present two sets of gear teeth arranged in axially spaced relationship being secured by screw-threaded engagement on the smaller diameter portion 13*d* for rotation together with the carrier 13. The inboard sprocket 15*b* is formed with an axial flange 15*b*' and thereby holds the extreme outboard sprocket 15*a* on the larger diameter portion 13*b* of the carrier 13 in spaced axial relationship thereto. Alternatively, a spacer seated on the shoulder could be provided for a like purpose. The two individual sprockets 15*b* of Fig. 2 may be connected by any suitable means such as screw threads, splines, or taper engagement.

Rotation of the sprockets 15*a* relative to the carrier 13, is precluded by providing such sprockets with recesses at the inner periphery thereof for engagement with the splines 13*c* on carrier 13.

The sprockets are located axially of the carrier 13 by a locknut 18 bearing against the end of the sprocket assembly, and extending radially outwardly beyond the periphery of the carrier 13 to define an abutment for the extreme inboard sprocket 15*a*, the locknut 18 being screw-threadedly engaged with the cone 17 and serving to lock the same against movement after adjustment.

As will readily be appreciated, the ball-race clearances of the free-wheeling mechanism can be set by suitable adjustment of the cone 17 and can be locked in this adjusted condition by means of the locknut 18. Should the need arise for adjustment of the setting this can be effected by releasing the locknut, adjusting the cone as appropriate and then tightening the locknut. There is no need to dismantle the block.

Replacement of the sprockets 15 is possible without disturbing the free-wheeling mechanism simply by removing the outermost sprockets 15*b* by unscrewing them and then sliding the remaining sprockets 15*a* from the carrier 13. Replacement sprockets are located against the abutment furnished by the locknut 18 and held in position by the screwed-on sprockets 15*b* which may also be changed.

WHAT WE CLAIM IS:—

1. A Derailleur block for a cycle or like wheel comprising in combination, sleeve-like means adapted to be rigidly secured to the hub of said wheel, outwardly-facing inboard and outboard peripheral formations on said sleeve-like means each defining one part of a ball race, a sprocket carrier, an internal inwardly-facing formation on said carrier complementary to said outboard peripheral formation on said sleeve-like means to complete a ball race, a free-wheeling mechanism between said sleeve-like means and said sprocket carrier, a cone, in screw-threaded adjustable engagement with the interior of said sprocket carrier at the inboard end thereof, a formation on said cone complementary to the said inboard peripheral formation of said sleeve-like means to complete another ball race, balls in said ball races, a lock nut in adjustable screw-threaded engagement with the exterior of said cone and forming an abutment at one end of said carrier, a first sprocket mounted on said carrier in engagement with said abutment, a plurality of intermediate sprockets mounted on said carrier and axially spaced from said first sprocket, and a final sprocket member in screw-threaded engagement with the periphery of said carrier and serving to secure the other sprockets in axial position.

2. A Derailleur block as set forth in claim 1 in which said sprocket carrier has a larger

diameter portion at its inboard nd, said larger diameter portion being splined, and a smaller diameter portion at its outboard end, said smaller diameter portion being externally screw-threaded, at least some of said sprockets being internally grooved for engagement with said splined larger diameter portion, and said final sprocket member being internally screw-threaded for engagement with said externally screw-threaded smaller diameter portion.

3. A Derailleur block as set forth in claim 1 or 2 in which said final sprocket m mber has two sprocket formations thereon.

4. A Derailleur block substantially as hereinbefore described with reference to and as illustrated in the accompanying drawings.

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1482075 COMPLETE SPECIFICATION

1 SHEET *This drawing is a reproduction of the Original on a reduced scale*

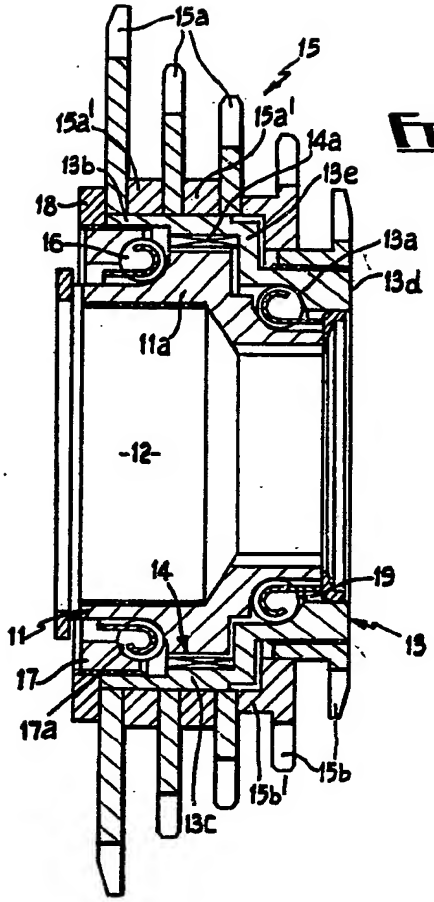

FIG. 1

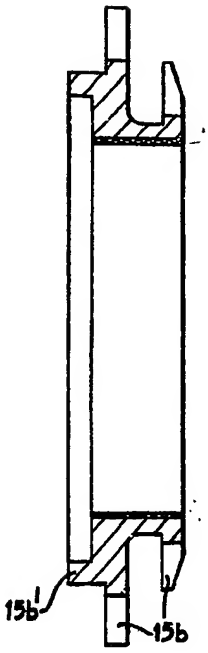

FIG. 2